

# Psychosocial consequences of dental fear and anxiety

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**Abstract – Objectives:** The aim of this study was to examine the negative psychosocial impacts of dental anxiety in a sample of dentally fearful and anxious individuals recruited from the general population. The associations between psychosocial impacts, dental anxiety scale (DAS) scores and other severe fears were explored.

**Methods:** One hundred and thirty-five subjects who were anxious or fearful about dental treatment were divided into low and high general fear groups based on the number of other severe fears they reported. Negative psychosocial impacts were assessed using a modified form of the scale developed by Kent et al. (1996). This consisted of three dimensions: psychological reactions, social relationships and avoidance/inhibition. Other measures included self-ratings of oral, general and emotional health and scales to assess self-esteem and morale. **Results:** Overall, 93.1% of subjects reported one or more impacts. Those in the high-fear group had higher psychosocial impact scores than those in the low-fear group (means of 4.19 vs. 2.85;  $P < 0.05$ ). Differences were most marked with respect to psychological consequences and avoidance/inhibition. The high-fear group had scores indicative of lower self-esteem and lower morale. Forward stepwise linear and logistic regression analyses indicated that both dental anxiety and general fearfulness contributed to these negative outcomes. However, the latter was a more consistent predictor in that it entered six of seven models generated while the former entered only four.

**Conclusion:** The study indicated that dental fear and anxiety have pervasive psychosocial consequences, and that these are more marked among subjects with high levels of general fearfulness. It also provided evidence of the validity of a modified form of the psychosocial impact scale developed by Kent et al. (1996).

**Key words:** dental anxiety; general fears; psychosocial impact

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Many fears and phobias, particularly those which are chronic, cause distress and impairment over long periods of time, may interfere with growth and development, undermine personality functioning and increase vulnerability to other psychopathology (1). Studies of psychiatric disorders have also revealed major personal costs in terms of role functioning and quality of life (2). One of the criteria used by the American Psychiatric Association to diagnose phobias is as follows: the avoidance, anxious anticipation or distress in the feared situation significantly interferes with normal daily routines, occupational functioning, social activities and relationships. Relatively little is known about how dental anxiety interferes with functioning and quality of life outside the dental setting (3). Schuurs et al. (4) found that fearful dental patients had low self-esteem and

were sensitive to their dental appearance. More extensive data were obtained by Berggren (5), who used a modified form of the Nottingham Health Profile to investigate negative emotional reactions and social isolation effects among individuals undergoing treatment for severe dental anxiety and found that the majority reported such effects. In order to provide a better basis for documenting such outcomes, Kent et al. (3) developed a scale to measure the social and psychological effects of dental anxiety.

To date, studies of the nondental outcomes of dental anxiety have been confined to severe cases, most of who were seeking treatment for their dental anxiety. It is likely that for many of these individuals their fear of dental treatment was complicated by multiple phobias, general anxiety states and other mood or emotional disorders.

Some indication that the negative consequences of dental anxiety may be a function of other psychological problems is to be found in the study by Berggren (5) and a more recent study by Abrahamson et al. (6). The latter used a 22-item version of the Fear Survey Schedule II (FSS II) to divide patients being treated for dental phobia into 'low general fear' and 'high general fear' groups. Although the two groups had similar dental anxiety scale (DAS) scores, the latter had higher scores on a measure of psychological distress than the former and reported more negative social and emotional consequences as a result of their dental anxiety. Moreover, while scores on the Dental Fear Scale (7) and the measure of psychological distress predicted negative emotional consequences, negative social consequences were predicted by psychological distress only.

Clearly, there is a need to investigate further the negative psychosocial effects of dental fear and anxiety, and to elucidate the characteristics of those who experience such outcomes. Studies are needed of individuals drawn from the general population, as opposed to clinical samples, to determine if the findings of the studies cited above apply to those whose dental anxiety is not so severe that they avoid dental treatment altogether. There is also a need to develop and validate further the scales and measures which are beginning to be used in this area of research.

Accordingly, this paper reports the results of a study that assessed the psychological and social consequences of dental fear and anxiety among a sample identified by means of a population-based survey. Its main aim was to determine whether the psychosocial problems reported by these individuals were a function of dental anxiety, more general fearfulness or both.

## Methods

### *Study procedures*

The data on which the paper is based were obtained as part of the 5-year follow-up phase of a longitudinal population-based study of the epidemiology and psychology of dental fear and anxiety in adults. At the baseline in 1993–1994, a four-wave mail survey was undertaken of a random sample of adults aged 18 years and over living in one of the communities that comprised metropolitan Toronto. A dental anxiety questionnaire was completed by 3055 participants. A subsample of 1420 also completed a psychological questionnaire comprised of a

number of scales that measured state anxiety, general fearfulness, mutilation fears, negative cognitions about dental treatment and symptoms potentially indicative of psychological disorders such as depression. Details of the baseline phase can be found in previous reports (8–10).

During 1998–1999, all baseline participants who indicated that they would be willing to participate in the 5-year phase were sent an additional questionnaire concerning changes in dental fear and anxiety over the 5-year period. Again, a four-wave procedure was used with an initial mailing and three follow-ups. The final mailing consisted of a short version of the questionnaire designed to promote a response from hard-core nonresponders. While baseline and follow-up dental anxiety questionnaires were very similar with respect to most variables, questions designed to assess the social and psychological consequences of dental fear and anxiety were included in the follow-up questionnaire only. General fears were also assessed at this phase. Consequently, all data reported in this paper are from the follow-up instrument.

All procedures used at baseline and follow-up were approved by the University of Toronto's Human Subjects Certification Committee.

### *Measures at 5-year follow-up*

#### *Dental fear and anxiety*

Anxiety and fear about dental treatment were measured using the DAS (11), the single item used by Milgrom et al. (12) and the Gatchel (13) single-item dental fear scale. The DAS is a well-known four-item measure giving rise to scores that range from 4 to 20. The Milgrom et al. (12) item asks subjects to rate their feelings about dental treatment on a 5-point scale (not at all afraid, a little afraid, somewhat afraid, very afraid, terrified), while the Gatchel (13) item asks subjects to rate their fear of dental treatment on a VAS type scale ranging from 1 (no fear) to 10 (extreme fear). Subjects who scored 12 or more on the DAS or reported being very afraid or terrified of dental treatment or scored 8 or more on the Gatchel scale were considered to be dentally fearful or anxious. This approach was used since each of the three measures failed to capture some individuals who were afraid of or anxious about dental treatment (8).

#### *General fears*

In common with other studies (6), general fear was assessed using a short-form of the FSS II (14). The validity of this 20-item version in distinguishing

different groups of dentally anxious individuals has been reported previously (10). The items used represented five fear dimensions: animals and natural events (e.g. snakes, thunder), death (death, life after death), evaluation fears (making mistakes, looking foolish), social situations (meeting people, meeting authority figures) and agoraphobic fears (crowded places, enclosed places). Each item was scored on a 7-point scale from 0 (no fear) to 6 (terror). Subjects who scored 5 or 6 on any fear were deemed to have a severe fear. The sum of all 20 items and the number of severe fears reported by each subject were used as measures of general fearfulness.

#### *Self-perceived health and psychological well being*

These were assessed using global self-ratings of oral, general and emotional health (excellent, very good, good, fair, poor), a 6-item measure of self-esteem (15) and a 6-item measure of morale (16), for which higher scores indicated lower self-esteem and lower morale. The measure of self-esteem consisted of both positively and negatively worded items such as 'I feel that I am a person of worth, equal to others' and 'All in all, I feel that I am a failure'. The measure of morale also consisted of positively and negatively worded items such as 'In general life gives me a lot of pleasure' and 'Nothing ever turns out for me the way I want'. For both scales the response options were: strongly agree = 1, agree = 2, disagree = 3 and strongly disagree = 4. The coding of the negatively worded items was reversed and scale scores computed by summing the response codes to the items. For both measures, high scores indicated greater psychological distress.

#### *Psychosocial consequences of dental fear and anxiety*

Psychosocial impacts were assessed only for those reporting fear or anxiety about dental treatment. They were measured by means of a modified form of the scale developed by Kent et al. (3). The modifications were made in order to improve the face and content validity of the scale. Of 15 items, 11 were derived from Kent et al. (3) while an additional four were added in order to tap feelings of inferiority and embarrassment. Subjects were asked if they experienced the situation described by each item, using a simple 'yes/no' response format. The items addressed three broad constructs, namely, psychological outcomes, negative effects on social relationships and avoidance/social inhibition. A psychosocial impact score was created by summing the number of positive responses to the 15 questions, and subscale scores created by summing the responses to

subsets of questions pertaining to each of the three dimensions encompassed by the measure.

The internal consistency reliability of the modified scale and its subscales was assessed using the Kuder-Richardson 20 (KR-20) statistic for scales composed of items with dichotomous responses. This is equivalent to Cronbach's alpha. Validity was assessed using procedures reported by Kent et al. (3). That is, associations between scale scores and scores on the DAS were examined, as were associations between scale scores and measures of dental visiting patterns and dental avoidance. The hypotheses tested were: (i) those with severe dental anxiety (DAS scores of 15 or above) would experience more psychosocial impacts than those with moderate levels of dental anxiety (DAS scores of 14 and below) and (ii) those with irregular dental visiting patterns and those avoiding dental care until in pain would also have higher scale scores.

#### *Data analysis*

Since almost all analyses involved the comparison of two groups, differences in means were tested using *t*-tests and differences in proportions using the chi-square test. Linear and logistic regression analyses were undertaken using forward selection procedures in order to determine the extent to which DAS scores and general fearfulness predicted psychosocial impacts and other psychological outcome variables. Gender was also included in these analyses as a control variable. *P*-values of <0.05 were taken to indicate the statistical significance of the associations examined.

## **Results**

#### *Response*

A follow-up questionnaire was completed by 1422 individuals, 215 of whom returned the short version used in the fourth mailing. Consequently, complete data were obtained from 1207 subjects, and are included in the analysis reported here. There was no difference in the mean baseline DAS scores of these 1207 subjects and the 3055 participating at baseline (8.0 vs. 8.3: NS; *t*-test). More extensive analyses of loss to follow-up and its effects on survey estimates are to be found in other reports (17, 18).

#### *Dental fear and anxiety*

Using the definition outlined above, 135 subjects or 11.2% of the 1207 subjects from whom complete data were obtained were classified as fearful or anxious

about dental treatment. Their mean DAS score was 13.7. The majority, 68.9%, had DAS scores of 14 or under and were considered to be moderately anxious and 31.1% had DAS scores of 15 or over and were considered to be severely anxious. Most of these dentally anxious subjects ( $n = 98$ ) were female.

### General fears

Among those classified as dentally fearful or anxious, one or more severe fears were reported by 72.9% and 25.2% reported five or more severe fears. The mean number of severe fears was 2.9 and the median 2.0. These subjects were divided into two groups based on the number of severe fears reported, using a median split. Those with two or fewer severe fears ( $n = 76$ ) were designated 'low general fear' and those with three or more severe fears ( $n = 59$ ) were designated 'high general fear'. The 1063 nondentally anxious individuals on whom complete FSS II data were obtained were used as a reference group in comparisons of emotional health and well being.

### Characteristics of low- and high-fear groups

There was no difference in the mean age of the two groups (45.4 years vs. 46.9 years, respectively). One half of the females (51.0%) were in the high-fear group compared to 25.0% of the males ( $P < 0.01$ ). The two groups differed with respect to general fears but were similar on all three measures of dental fears and anxiety (Table 1).

The mean DAS score of the 1063 nondentally anxious subjects was 7.0, which was significantly different from both the low and high general fear groups. The same was also the case for the other two measures of dental fear and anxiety. However, the mean FSS II scores of the low general fear group and the nondentally anxious reference group were not significantly different (32.07 vs. 35.94; NS:  $t$ -test).

### Reliability and validity of the psychosocial impact scale

The internal consistency reliability of the psychosocial impact scale was 0.74, exceeding the criterion of 0.70 for group comparisons. KR-20 values for the subscales were 0.48, 0.62 and 0.66, respectively. The mean score of those with moderate levels of dental anxiety ( $DAS \leq 14$ ) was 2.69, significantly lower than the score of 4.84 for those with severe dental anxiety ( $DAS \geq 15$ ) ( $P < 0.01$ ;  $t$ -test). Those making irregular dental visits in the 5 years since baseline had higher scores than regular visitors (3.45 vs. 1.86:  $P < 0.001$ ;  $t$ -test), and those who reported avoiding dental care until in pain also had higher scores than those who did not (4.45 vs. 1.75, respectively:  $P < 0.001$ ;  $t$ -test).

### Prevalence of psychosocial impacts

Table 2 shows the percentage of those fearful or anxious about dental treatment responding positively to each of the psychosocial impact items. The most commonly reported were feeling foolish about being afraid of dental treatment (51.8%), worrying about the state of the dentition (45.9%), feeling upset when going by a dental office (37.3%) and hiding fears about dental treatment from others (34.8%). Although those with high general fear were more likely to report 13 of the 15 impacts, the difference was statistically significant for only two of the items.

Overall, 93.1% of the 135 dentally fearful or anxious subjects reported one or more psychosocial consequences, 83.8% experienced psychological problems, 60.4% reported problems with respect to social relationships and 20.7% reported avoidance/social inhibition. Mean scale scores indicated that the high general fear group reported more negative consequences than the low general fear group, while mean subscale scores indicated that they experienced more psychological problems and more

Table 1. Characteristics of dentally anxious subjects with low and high general fears

	Low general fear ( $n = 76$ )	High general fear ( $n = 59$ )	$P^*$
Mean (SD) FSS II score	32.07 (15.8)	57.91 (9.14)	<0.001
Mean (SD) number of severe fears	0.80 (0.87)	5.57 (2.57)	<0.001
Death	0.03 (0.16)	0.42 (0.67)	<0.001
Animals	0.37 (0.63)	1.83 (1.30)	<0.001
Agoraphobic	0.22 (0.48)	0.81 (0.92)	<0.01
Evaluation	0.14 (0.35)	1.96 (1.77)	<0.001
Social	0.03 (0.16)	0.54 (0.86)	<0.001
Mean (SD) DAS score	13.4 (2.37)	14.1 (2.16)	NS
Mean (SD) score on Milgrom et al. item	3.28 (0.83)	3.53 (1.02)	NS
Mean (SD) score on Gatchel scale	6.47 (1.55)	6.88 (1.89)	NS

\* $P$ -values derived from independent samples  $t$ -tests.

Table 2. Per cent responding positively to each item from the psychosocial consequences scale

	All dentally anxious subjects ( <i>n</i> = 135) (%)	Low general fear group ( <i>n</i> = 76) (%)	High general fear group ( <i>n</i> = 59) (%)
Psychological reactions			
The need to see a dentist is constantly on my mind	27.7	21.0	36.0
I worry about my teeth falling apart	45.9	32.2	62.0*
I feel foolish being afraid of dental treatment	51.8	51.6	52.0
I feel upset when I go by a dental office	37.3	33.3	32.0
I get upset when people talk about having fillings or injections	27.7	22.6	34.0
Interpersonal relations			
I hide my fears of dental treatment from other people	34.8	35.5	34.0
I feel people will laugh if I tell them about my fears of dental treatment	18.9	16.7	22.4
I have arguments with friends, partner or family about not going to the dentist	17.7	14.3	22.0
People tell me my fears of dental treatment are childish or ridiculous	20.9	17.7	25.0
I get annoyed when people try to pressure me into having dental treatment	29.4	23.3	36.7
Avoidance/social inhibition			
If possible, I avoid going past a dental office	3.6	1.6	6.0
I hide my teeth when I laugh or smile	21.2	14.3	30.0**
I am reluctant to meet new people because of the state of my teeth	8.9	6.5	12.0
I have avoided applying for jobs because of the state of my teeth	2.7	1.6	4.1
I refuse invitations because of the state of my teeth	1.8	0.0	4.1

\*Differences between low and high general fear groups:  $P < 0.01$ ; chi-square test.

\*\*Differences between low and high general fear groups:  $P < 0.05$ ; chi-square test.

problems with respect to avoidance/social inhibition (Table 3).

The correlation between the psychosocial impact score and the DAS was 0.50 ( $P < 0.001$ ) and between the psychosocial impact score and the number of severe fears was 0.42 ( $P < 0.001$ ). In a forward step-wise linear regression analysis with the psychosocial

impact score as the dependent variable, both the DAS score and the number of severe fears had significant independent effects (Table 4). The DAS score and the number of severe fears also entered models predicting scores on the psychological reactions and avoidance/social inhibition subscales. Only the number of severe fears entered the model predicting

Table 3. Mean psychosocial impact scores and per cent reporting one or more impacts

	All dentally anxious subjects	Low general fear group	High general fear group	<i>P</i> *
Psychosocial impacts				
Mean (SD) score	3.47 (2.78)	2.85 (2.44)	4.19 (3.01)	<0.05
% with one or more impacts	93.1	89.1	97.9	NS
Psychological reactions				
Mean (SD) score	1.85 (1.36)	1.52 (1.26)	2.22 (1.37)	<0.01
% with one or more impacts	83.8	76.8	91.8	<0.05
Social relationships				
Mean (SD) score	1.19 (1.33)	1.05 (1.28)	1.36 (1.39)	NS
% with one or more impacts	60.4	55.9	66.0	NS
Avoidance/social inhibition				
Mean (SD) score	0.38 (0.83)	0.23 (0.64)	0.57 (1.00)	<0.05
% with one or more impacts	20.7	12.9	30.6	<0.05

\**P*-value for differences between low and high general fear group; *t*-test for means and chi-square tests for proportions.

Table 4. Results of the stepwise linear regression analyses predicting psychosocial consequences

	$\beta$	SE	P
Dependent variable: psychosocial impact score			
Independent variables			
DAS score	0.505	0.118	<0.001
Number of severe fears	0.273	0.082	<0.01
Constant	-4.419	1.583	<0.01
$F = 23.0; P < 0.01; \text{adjusted } R^2 = 0.31$			
Dependent variable: psychological reactions score			
Independent variables			
DAS score	0.278	0.056	<0.001
Number of severe fears	0.124	0.039	<0.01
Constant	-2.422	0.759	<0.01
$F = 26.4; P < 0.01; \text{adjusted } R^2 = 0.33$			
Dependent variable: social relations score			
Independent variables			
Number of severe fears	0.110	0.043	<0.05
Constant	0.861	0.181	<0.001
$F = 6.7; P < 0.05; \text{adjusted } R^2 = 0.05$			
Dependent variable: inhibition/avoidance score			
Independent variables			
DAS score	0.117	0.035	<0.01
Number of severe fears	0.076	0.024	<0.01
Constant	-1.493	0.466	<0.01
$F = 16.7; P < 0.01; \text{adjusted } R^2 = 0.23$			

Note: Gender was included as a predictor variable but did not enter any of the models.

problems in social relationships. When gender was included as a predictor variable it did not enter any of the four models.

### *Oral, general and emotional health*

There were no differences between the high and low general fear groups in the proportion reporting their oral health as only fair or poor (34.5% vs. 34.2%, respectively), or their general health as only fair or poor (15.3% vs. 12.2%, respectively). Only 10.4% of the nonanxious reference groups reported fair or poor oral health and 9.5% reported fair or poor general health. More of the high general fear group reported poor emotional health than the low general fear group (15.5% vs. 6.8%, respectively), although the difference was not significant. However, the high-fear group had higher scores on the measure of self-esteem than the low-fear group (means of 11.28 vs. 10.23:  $P < 0.05$ ;  $t$ -test) and higher scores on the measure of morale (means of 13.09 vs. 11.29:  $P < 0.01$ ;  $t$ -test). The nonanxious reference group was similar to the low-fear group with respect to all measures of emotional health but significantly different from the high-fear group on all measures.

Forward stepwise logistic and linear regression analyses including only the dentally anxious sub-

jects indicated that the DAS score was a significant predictor of poor emotional health ( $P < 0.05$ ), while the number of severe fears was a significant predictor of scores on the measure of self-esteem ( $P = 0.05$ ) and the measure of morale ( $P < 0.01$ ) after controlling for gender.

## Discussion

The main aim of the study reported here was to describe some of the negative psychosocial consequences of dental fear and anxiety, and to determine whether or not previous findings based on studies of clinical populations applied to subjects recruited from the general population. Previous work in this area has largely addressed the 'nondental' outcomes of dental anxiety among individuals who have sought treatment for their fears and phobias about dental care at specialized clinics. These individuals tend to be at the severe end of the anxiety spectrum as evidenced by mean DAS scores of 16 or 17. In this study, individuals were identified using a population-based survey, with most having DAS scores of 12–14. The results suggest that the majority of these dentally anxious subjects experience some negative

psychological or social consequences in addition to avoidance of dental care and compromised oral health.

In order to address the effects of broader psychological states, the dentally anxious individuals we identified were divided into high and low general fear groups based on the number of other severe fears they reported. The two groups differed on measures of self-esteem and morale. Further evidence of differences in their emotional and psychological characteristics comes from data collected at baseline. Forty-five of the low general fear group and 38 of the high general fear group completed the psychological questionnaire used at that phase. The high general fear subjects had higher scores than the low general fear subjects for the Mutilation Questionnaire (19), which measures blood and body injury fears; higher scores on the General Health Questionnaire (20), which measures symptoms potentially indicative of psychiatric disorder; higher scores on the Spielberger Trait Anxiety Index (21) and more negative cognitions concerning dental treatment (22). They also had higher scores on the FSS II measured at baseline, indicating that their high level of general fearfulness had persisted over time. Moreover, the low general fear group was similar to the nonanxious reference group on most of the measures of psychological well being used at baseline and follow-up. Consequently, these data support the view that those in the low-fear group had a specific fear of dental treatment while those in the high-fear group had a more complex psychological profile involving generalized anxiety, psychological symptoms and lower morale and lower self-esteem (6). In this respect, the number of other severe fears may be used as a marker of these broad diagnostic groups. Other investigations of dentally fearful and anxious subjects provide support for this diagnostic classification (23).

The results confirm the earlier study of Abrahamson et al. (6) which indicated that dentally anxious subjects with both low and high general fears experienced significant negative outcomes that went beyond avoidance of dental care and poor oral health. They also support their observation that these outcomes were more marked among individuals in the high general fear group. The regression analyses presented here also suggested that general fearfulness had a broader influence with respect to these negative emotional and social outcomes than dental anxiety *per se*. Further comparisons between our results and those of Abrahamson et al. (6) and Berggren (5) are not possible because of differences

in the measures used to document the psychosocial consequences of dental fear and anxiety.

The data also support components of the 'vicious cycle' model of dental fear and avoidance (5). In this model, dental fear and anxiety lead to avoidance of dental care, which over time leads to an actual or perceived deterioration in oral health. Poor oral health, whether actual or perceived, combined with the individual's inability to accept dental treatment, lead to feelings of shame and inferiority. These may serve to increase anxiety and reinforce the avoidance of dental care. The psychosocial impact scale revealed that many of these subjects felt foolish being anxious about dental treatment, and hid their fears from others because of concerns about being ridiculed or laughed at. This is probably linked to the social evaluation fears that were marked among the high general fear group. Almost one-third of this group (27.3%) expressed a profound fear of looking foolish and almost half (45.5%) expressed a fear of being criticized.

This study also provides additional evidence of the internal consistency reliability and validity of the modified psychosocial impact scale used here based on that originally developed by Kent et al. (3). It provides evidence of its utility with respect to dentally anxious individuals with both moderate and severe dental fear and anxiety. The scale performed well even when its items were scored using a simple 'yes/no' response format in contrast to the frequency response format used by Kent et al. (3). The internal consistency reliability coefficient (KR-20) was high, and scores from the scale showed significant associations with DAS scores, scores from the FSS II and measures of dental service use and avoidance. Even though the scale may not encompass all the negative consequences of fear and anxiety about dental treatment, it supplements existing measures that document the problems these people experience within the dental setting. Consequently, it broadens our understanding of dental anxiety and may prove useful in studies of different approaches for treating this problem. It also suggests that by helping people overcome their fears of dental treatment, dentists may contribute to the overall well being and quality of life of their patients and as well as their oral health.

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